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76225

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05/19/2010

Gerbera/BSTZ

Blakely Sokoloff Taylor & Zafman LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085

EXAMINER

PATEL, KAUSHIKKUMAR M

ART UNIT

PAPER NUMBER

2186

DATE MAILED: 05/10/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,621	02/20/2004	Anoop Mukker	8410P18614	7209

TITLE OF INVENTION: METHOD AND APPARATUS FOR DEDICATING CACHE ENTRIES TO CERTAIN STREAMS FOR PERFORMANCE OPTIMIZATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/10/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

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If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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76225 7590 05/10/2010
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 Blakely Sokoloff Taylor & Zafman LLP
 1279 OAKMEAD PARKWAY
 SUNNYVALE, CA 94085

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/783,621 02/20/2004 Anoop Mukker 8410P18614 7209

TITLE OF INVENTION: METHOD AND APPARATUS FOR DEDICATING CACHE ENTRIES TO CERTAIN STREAMS FOR PERFORMANCE OPTIMIZATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/10/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, KAUSHIKKUMAR M	2186	711-129000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
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4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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76225	7590	05/19/2010	EXAMINER	
Gerbera/BSTZ Blakely Sokoloff Taylor & Zafman LLP 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085			PATEL, KAUSHIKKUMAR M.	
			ART UNIT	PAPER NUMBER
			2186	

DATE MAILED: 05/10/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 162 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 162 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/783,621

Applicant(s)

MUKKER ET AL.

Examiner

Kaushikkumar Patel

Art Unit

2186

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendments filed on 3/1/2010.
2. ☒ The allowed claim(s) is/are 1,2,4,6-8,10-14,16,18-20,22,24-27,29,30 and 32-34.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Sheng-Jen Tsai/
Primary Examiner, Art Unit 2186

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David F. Nicholson (Reg. No. 62,888) on May 4, 2010.

2. The application has been amended as follow:

In the claims:

Claim 1. (Currently Amended) A method, comprising:

partitioning a cache array into one or more special-purpose entries and one or more general-purpose entries, wherein special-purpose entries are only allocated for one or more streams having a particular stream ID and the particular stream ID is stored outside the cache array, wherein the special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second cache replacement algorithm, wherein the first and second cache replacement algorithms are different;

storing data from the one or more streams in the one or more special-purpose entries when the particular stream ID and a particular input address match a predetermined stream ID and a predetermined input address;

storing data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address;

determining if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries; and

if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

Claim 2. (Currently Amended) The method as claimed in claim 1, further comprising allocating the one or more special-purpose entries based on the particular stream ID and [[a]] the particular input address.

Claim 3. (Canceled)

Claim 4. (Currently Amended) The method as claimed in claim [[3]] 2, further comprising determining when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address using special-purpose control logic.

Claim 5. (Canceled)

Claim 6. (Previously Presented) The method as claimed in claim 4, wherein the one or more streams are special-purpose streams including graphics streams.

Claim 7. (Currently Amended) A device comprising:

a cache memory array partitioned into one or more special-purpose entries and one or more general-purpose entries, wherein special-purpose entries are only allocated for one or more streams having a particular stream ID, wherein the particular stream ID is stored outside the cache array;

control logic to determine if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries, wherein the control logic comprises:

special-purpose control logic to store data from the one or more streams in the one or more special-purpose entries when the particular stream ID and ~~[[the]]~~ a particular input address match a predetermined stream ID and a predetermined input address, the special-purpose control logic to implement a first cache replacement algorithm for the one or more special-purpose entries, and

general-purpose control logic to store data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address, the general-purpose control logic to implement a second cache replacement algorithm for the one or more general-purpose entries, wherein the first and second cache replacement algorithms are different; and

if the cross-access scenario exists, the control logic to permit cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access

scenario.

Claim 8. (Currently Amended) The device as claimed in claim 7 further comprising:

the control logic to allocate the one or more special-purpose entries based on the particular stream ID and the particular input address.

Claim 9. (Canceled)

Claim 10. (Previously Presented) The device as claimed in claim 8, wherein the special-purpose control logic determines when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address.

Claim 11. (Original) The device of claim 10, further comprising a DRAM controller integrated with the cache memory array.

Claim 12. (Original) The device of claim 11, further comprising an integrated graphics controller, a host AGP controller, and an I/O hub interface coupled to the DRAM controller.

Claim 13. (Currently Amended) A computer-readable medium having stored thereon a plurality of instructions, the plurality of instructions when executed by a computer, cause the computer to perform the method comprising:

partitioning a cache array into one or more special-purpose entries and one or more general-purpose entries, wherein special-purpose entries are only allocated for one or more streams having a particular stream ID and the particular stream ID is stored outside the cache array, wherein the special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second

cache replacement algorithm, wherein the first and second cache replacement algorithms are different;

storing data from the one or more streams in the one or more special-purpose entries when the particular stream ID and the particular input address match a predetermined stream ID and a predetermined input address;

storing data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address;

determining if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries; and

if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

Claim 14. (Currently Amended) The computer-readable medium of claim 13 having stored thereon additional instructions, the additional instructions when executed by a computer, cause the computer to further perform the method of allocating the one or more special-purpose entries based on the particular stream ID and [[a]] the particular input address.

Claim 15. (Canceled)

Claim 16. (Currently Amended) The computer-readable medium of claim [[15]] 14 having stored thereon additional instructions, the additional instructions when executed

by a computer, cause the computer to further perform the method of determining when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address using special-purpose control logic.

Claim 17. (Canceled)

Claim 18. (Previously Presented) The computer-readable medium of claim 16, wherein the one or more streams are special-purpose streams including graphics streams.

Claim 19. (Currently Amended) A system, comprising:

means for partitioning a cache array into one or more special-purpose entries and one or more general-purpose entries, wherein the special-purpose entries are only allocated for one or more streams having a particular stream ID and the particular stream ID is stored outside the cache array, wherein the special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second cache replacement algorithm, wherein the first and second cache replacement algorithms are different;

means for storing data from the one or more streams in the one or more special-purpose entries when the particular stream ID and the particular input address match a predetermined stream ID and a predetermined input address;

means for storing data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address;

means for determining if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries; and

if the cross-access scenario exists, means for permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

Claim 20. (Currently Amended) The system as claimed in claim 19, further comprising means for allocating the one or more special-purpose entries based on the particular stream ID and [[a]] the particular stream address.

Claim 21. (Canceled)

Claim 22. (Currently Amended) The system as claimed in claim [[21]] 20, further comprising means for determining when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address using special-purpose control logic.

Claim 23. (Canceled)

Claim 24. (Previously Presented) The system as claimed in claim 22, wherein the one or more streams are special-purpose streams including graphics streams.

Claim 25. (Currently Amended) A system, comprising:

a system memory controller, comprising a cache memory array partitioned into one or more special-purpose entries and one or more general-purpose entries, wherein special-purpose entries are only allocated for one or more streams having a particular stream ID and the particular stream ID is stored outside the cache array, wherein the

special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second cache replacement algorithm, wherein the first and second cache replacement algorithms are different;

control logic, coupled to the cache memory array, the control logic to determine if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries;

if the cross-access scenario exists, the control logic to permit cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario;

wherein the control logic further comprises:
special-purpose control logic to store data from the one or more streams in the one or more special-purpose entries when the particular stream ID and the particular input address match a predetermined stream ID and a predetermined input address;

general-purpose control logic to store data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address; and

system memory connected to the system memory controller.

Claim 26. (Previously Presented) The system as claimed in claim 25, further comprising one or more interfaces connected to the system memory controller, including

an I/O hub interface connected to a bus,

a processor interface; and

a host AGP controller connected to the system memory controller via the bus;

wherein the cache array receives the cache operation requesting data via the one or more interfaces, and returns a cache hit in response to the cache operation, wherein the cache has a pending fetch for the data in response to a prior cache operation requesting the data.

Claim 27. (Previously Presented) The system as claimed in claim 26, wherein the processor interface connects to a processor of a plurality of processors, the plurality of processors including a 16 bit processor and a 64 bit processor.

Claim 28. (Canceled)

Claim 29. (Currently Amended) The system as claimed in claim [[28]] 27, wherein the special-purpose control logic determines when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address.

Claim 30. (Currently Amended) A device, comprising:

a hub interface to use with a 64-bit processing architecture;

a cache memory array partitioned into one or more special-purpose entries and one or more general-purpose entries; and

control logic to allocate the one or more special-purpose entries based on a particular stream ID and a particular input address, wherein the particular stream ID is stored outside the cache array, wherein the special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second

cache replacement algorithm, wherein the first and second cache replacement algorithms are different;

determine if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries;

if the cross-access scenario exists, permit cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario;

wherein the control logic further comprises:

special-purpose control logic to store data from the one or more streams in the one or more special-purpose entries when the particular stream ID and the particular input address match a predetermined stream ID and a predetermined input address;
and

general-purpose control logic to store data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address.

Claim 31. (Canceled)

Claim 32. (Currently Amended) The device as claimed in claim [[31]] 30, wherein the special-purpose control logic determines when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address.

Claim 33. (Previously Presented) The device of claim 32, further comprising a DRAM controller integrated with the cache memory array.

Claim 34. (Previously Presented) The device of claim 32, further comprising an integrated graphics controller, and a host AGP controller.

Claims 35-40. (Canceled)

Allowable Subject Matter

3. Claims 1, 2, 4, 6-8, 10-14, 16, 18-20, 22, 24-27, 29, 30, and 32-34 are allowed.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaushikkumar Patel whose telephone number is (571)272-5536. The examiner can normally be reached on 8.00 am - 5.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kaushikkumar Patel
Examiner
Art Unit 2186

/kmp/

/Sheng-Jen Tsai/
Primary Examiner, Art Unit 2186